

1     CLAIMS:

2           1.     A method of removing at least some of a material from a  
3 semiconductor substrate, comprising:

4                 feeding a feed gas through an ozone generator to generate ozone  
5 from the feed gas; the feed gas comprising at least 99.999% O<sub>2</sub> (by  
6 volume); and

7                 contacting the ozone or a fragment of the ozone with a material  
8 on a semiconductor substrate to remove at least some of the material  
9 from the semiconductor substrate.

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11           2.     The method of claim 1 further comprising irradiating at least  
12 some of the ozone with ultraviolet light prior to the contacting.

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14           3.     The method of claim 1 further comprising irradiating at least  
15 some of the ozone with ultraviolet light proximate the material.

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17           4.     The method of claim 1 wherein the material on the  
18 semiconductor substrate is photoresist.

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20           5.     The method of claim 1 further comprising mixing the ozone  
21 with water vapor prior to the contacting.

1           6.     The method of claim 1 further comprising mixing the ozone  
2 with an organic solvent vapor prior to the contacting.

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4           7.     A method of removing at least some of a material from a  
5 semiconductor substrate, comprising:

6                 feeding a feed gas through an ozone generator to generate ozone  
7 from the feed gas; the feed gas comprising O<sub>2</sub> and less than or equal  
8 to 0.001% N<sub>2</sub> (by volume); and

9                 contacting the ozone or a fragment of the ozone with a material  
10 on a semiconductor substrate to remove at least some of the material  
11 from the semiconductor substrate.

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13           8.     The method of claim 7 further comprising irradiating at least  
14 some of the ozone with ultraviolet light prior to the contacting.

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16           9.     The method of claim 7 wherein the material on the  
17 semiconductor substrate is photoresist.

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19           10.    The method of claim 7 further comprising mixing the ozone  
20 with water vapor prior to the contacting.

1           11. The method of claim 7 further comprising mixing the ozone  
2 with an organic solvent vapor prior to the contacting.

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4           12. A method of removing at least some of a material from a  
5 semiconductor substrate, comprising:

6           forming a mixture of ozone and organic solvent vapors in a  
7 reaction chamber; and

8           contacting at least some of the ozone and solvent vapors with a  
9 material on a semiconductor substrate to remove at least some of the  
10 material from the semiconductor substrate.

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12           13. The method of claim 12 wherein the material on the  
13 semiconductor substrate is photoresist.

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15           14. The method of claim 12 wherein the material on the  
16 semiconductor substrate is photoresist; wherein the semiconductor  
17 substrate comprises  $\text{Al}_2\text{O}_3$ ; and further comprising exposing at least some  
18 of the  $\text{Al}_2\text{O}_3$  to the ozone during the contacting.

1           15. The method of claim 12 wherein the material on the  
2 semiconductor substrate is photoresist; wherein the semiconductor  
3 substrate comprises platinum; and further comprising exposing at least  
4 some of the platinum to the ozone during the contacting.

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6           16. The method of claim 12 further comprising providing a  
7 reservoir of volatile organic solvent within the reaction chamber and  
8 forming the solvent vapors from the volatile organic solvent.

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10           17. The method of claim 16 wherein the volatile organic solvent  
11 is a liquid.

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13           18. The method of claim 16 wherein the volatile organic solvent  
14 comprises acetone.

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16           19. The method of claim 16 wherein the volatile organic solvent  
17 consists essentially of acetone.

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19           20. The method of claim 16 wherein the volatile organic solvent  
20 comprises cyclohexanone.

1           21. The method of claim 16 wherein the volatile organic solvent  
2 consists essentially of cyclohexanone.

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4           22. The method of claim 16 wherein the volatile organic solvent  
5 comprises a mixture of cyclohexanone and PGMEA.

6  
7           23. The method of claim 16 wherein the volatile organic solvent  
8 comprises propylene glycol.

9  
10          24. The method of claim 12 further comprising providing a  
11 reservoir of volatile organic solvent within the reaction chamber and  
12 heating the volatile organic solvent to form the solvent vapors from the  
13 volatile organic solvent.

1           25. A method of removing at least some of a material from a  
2 semiconductor substrate, comprising:

3           forming a mixture of ozone and organic solvent vapors in a  
4 reaction chamber;

5           irradiating at least some of the ozone with ultraviolet light to form  
6 ozone fragments from the ozone; and

7           contacting at least some of the ozone fragments and solvent vapors  
8 with a material on a semiconductor substrate to remove at least some  
9 of the material from the semiconductor substrate.

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11           26. The method of claim 25 wherein the material on the  
12 semiconductor substrate is photoresist.

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14           27. The method of claim 25 further comprising providing a  
15 reservoir of volatile organic solvent within the reaction chamber and  
16 forming the solvent vapors from the volatile organic solvent.

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18           28. The method of claim 27 wherein the volatile organic solvent  
19 is a liquid.

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21           29. The method of claim 27 wherein the volatile organic solvent  
22 comprises acetone.

1           30. The method of claim 27 wherein the volatile organic solvent  
2 comprises cyclohexanone.

3  
4           31. The method of claim 27 wherein the volatile organic solvent  
5 comprises a mixture of cyclohexanone and PGMEA.

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7           32. The method of claim 27 wherein the volatile organic solvent  
8 comprises propylene glycol.

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10          33. The method of claim 25 further comprising providing a  
11 reservoir of volatile organic solvent within the reaction chamber and  
12 heating the volatile organic solvent to form the solvent vapors from the  
13 volatile organic solvent.

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15          34. The method of claim 25 wherein the material on the  
16 semiconductor substrate is photoresist; wherein the semiconductor  
17 substrate comprises  $\text{Al}_2\text{O}_3$ ; and further comprising exposing at least some  
18 of the  $\text{Al}_2\text{O}_3$  to the ozone fragments during the contacting.

1           35. The method of claim 25 wherein the material on the  
2 semiconductor substrate is photoresist; wherein the semiconductor  
3 substrate comprises platinum; and further comprising exposing at least  
4 some of the platinum to the ozone fragments during the contacting..  
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